

# UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 3575

FORD PARKWAY

OVER THE

MISSISSIPPI RIVER

DISTRICT 9 - RAMSEY COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 122)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 3575, Piers 7 through 9, were found to be in good to satisfactory condition with no defects of structural significance observed. Footing exposure was observed around the entire perimeters of Piers 8 and 9. In addition, minor undermining was observed at the northeast corner of Pier 8. Aside from some localized areas of scour around Piers 8 and 9, the channel bottom around the substructure units appeared stable with some aggradation since the last inspection that appears to be related to concrete rubble dropped around the piers during recent superstructure rehabilitation. In addition, many of the previously noted substructure defects (section losses) appear to have been repaired.

INSPECTION FINDINGS:

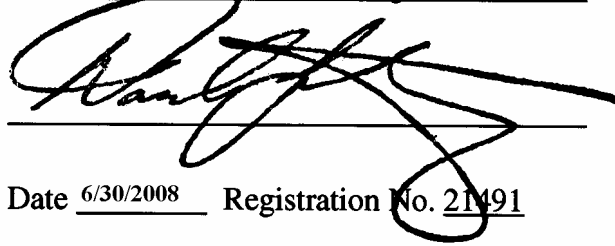
- (A) A band of light to moderate scaling was observed around the entire perimeter of all of the substructure units near the waterline, with random section losses have penetrations of 1 to 3 inch typical and 6 inch maximum (at Pier 7).
- (B) The footing was exposed around the entire perimeter of Piers 8 and 9. Typically, the exposed portions of the footing exhibited heavy scaling with 1 to 2 feet of penetration related to section loss.
- (C) Undermining of the footing was observed at the northeast corner of Pier 8, with a cavity that was 3 feet long by 1 foot high with up to 1 foot of horizontal penetration.
- (D) Localized scour depressions were observed around the upstream end of Piers 8 and 9 with typical depths of 5 to 10 feet. Concrete rubble with protruding reinforcing bars was found at the base of the scour depressions, as well as around much of the piers, appearing to have found its way there as the result of recent concrete rehab at the bridge.

RECOMMENDATIONS:

- (A) Monitor footing exposures at Piers 8 and 9 and undermining at Pier 8 during future underwater inspections for further vertical face exposure and/or undermining.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg  
Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 3575

Feature Crossed: Mississippi River

Feature Carried: Ford Parkway

Location: District 9 - Ramsey County

Bridge Description: The superstructure consists of eleven spans of various configurations. The three main spans over the river each consist of a 300 foot long open spandrel, reinforced concrete arch. The reinforced concrete deck is supported by intermediate concrete pedestals cast into the arches. The arches are supported at the piers, which are supported by footings founded on multiple concrete caissons (Piers 8 and 9) or by spread footing (Pier 7).

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 18, 2007

Weather Conditions: Partly Cloudy, 60°F

Underwater Visibility: 1.0 foot

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 7, 8, and 9.

General Shape: The piers consist of two rectangular reinforced concrete columns which intersect the arches at a common rectangular concrete footing (pier base). Pier 7 is supported by a rectangular spread footing. Piers 8 and 9 are supported by a rectangular footing founded on four large diameter concrete caissons.

Maximum Water Depth at Substructure Inspected: Approximately 30.7 feet.

4. WATERLINE DATUM

Water Level Reference: Bench mark on south end of Pier 9.

Water Surface: The waterline was approximately 4.0 feet below reference.

Waterline Elevation = 726.0

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code N/96

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

       Yes   X   No



Photograph 1. Overall View of Bridge, Looking Southwest.

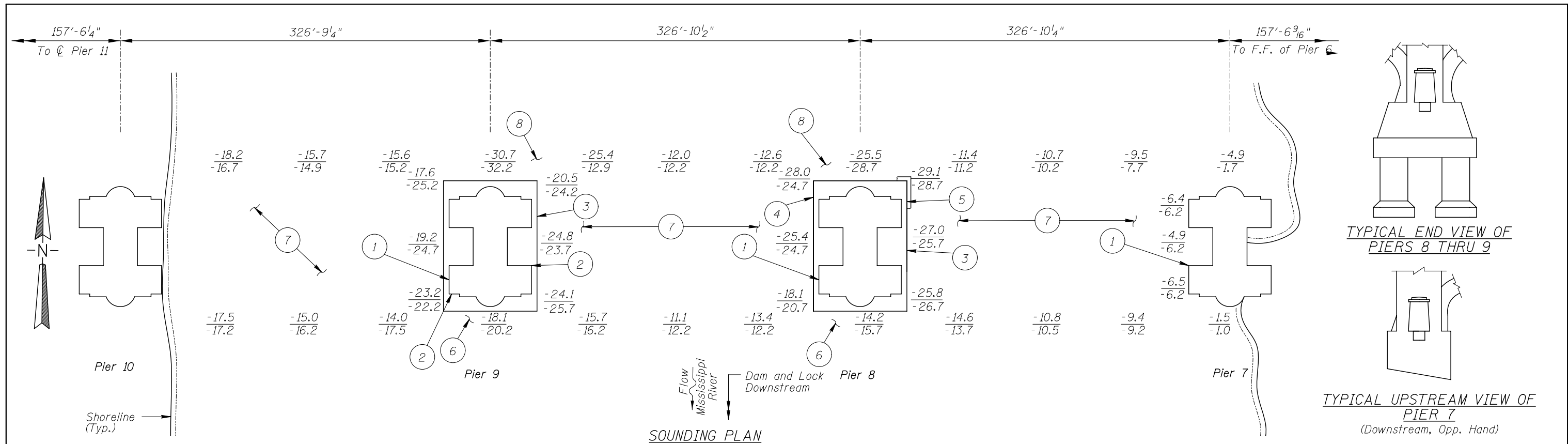


Photograph 2. View of Pier 8, Looking Northeast.

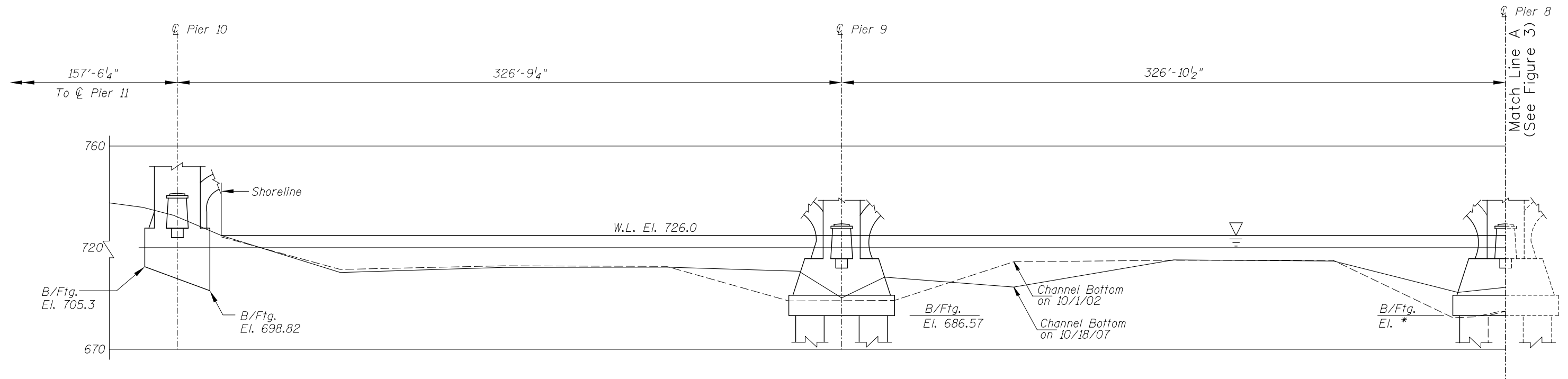




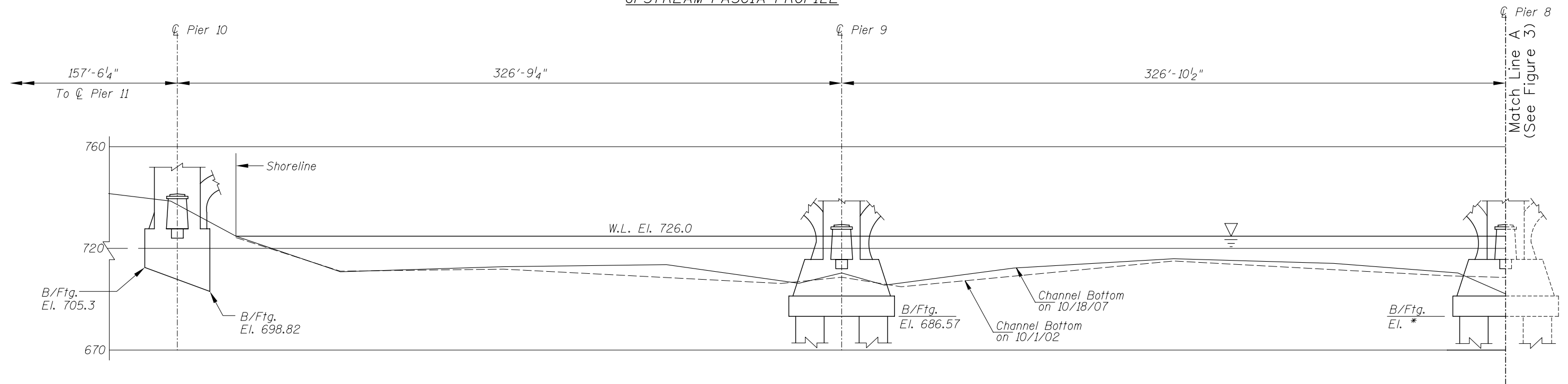
Photograph 3. View of Pier 9, Looking East.







UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

\* The bottom of footing elevation noted on the Design Plans does not correspond to the soundings and/or undermining detected at the time of the underwater inspection.

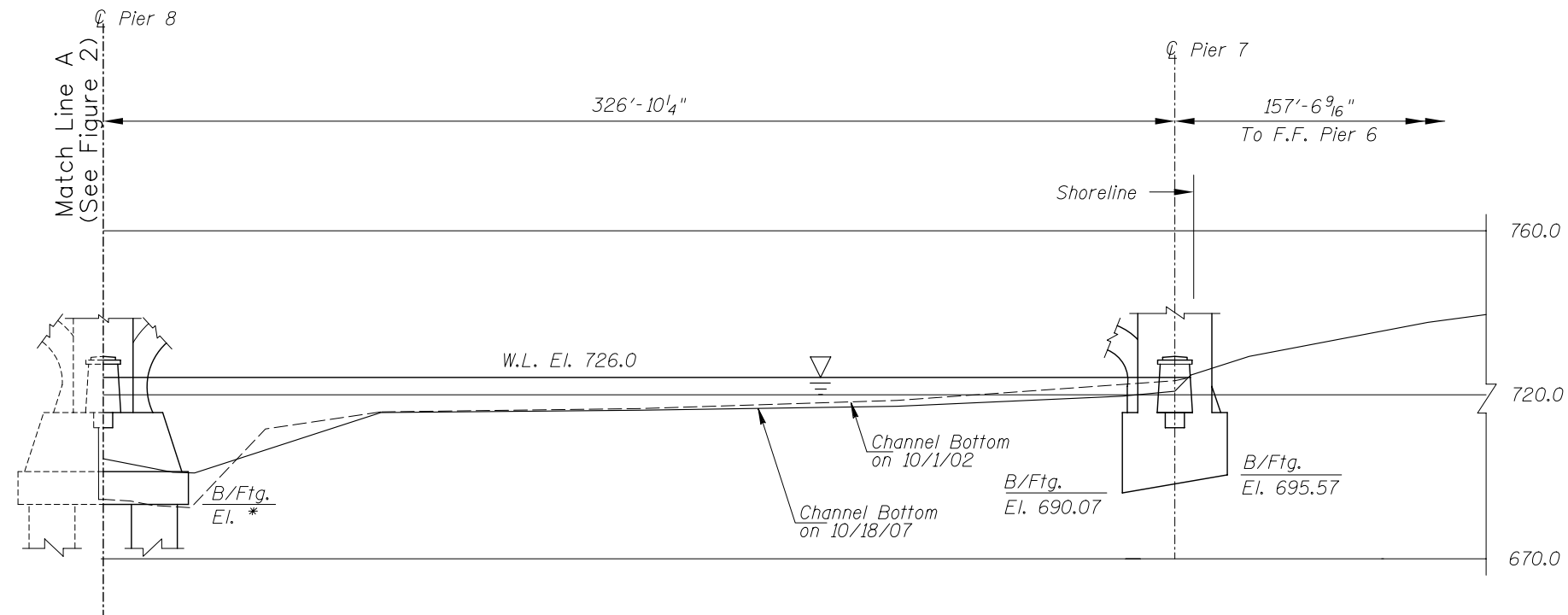
Note:

Refer to Figure 1 for General Notes.

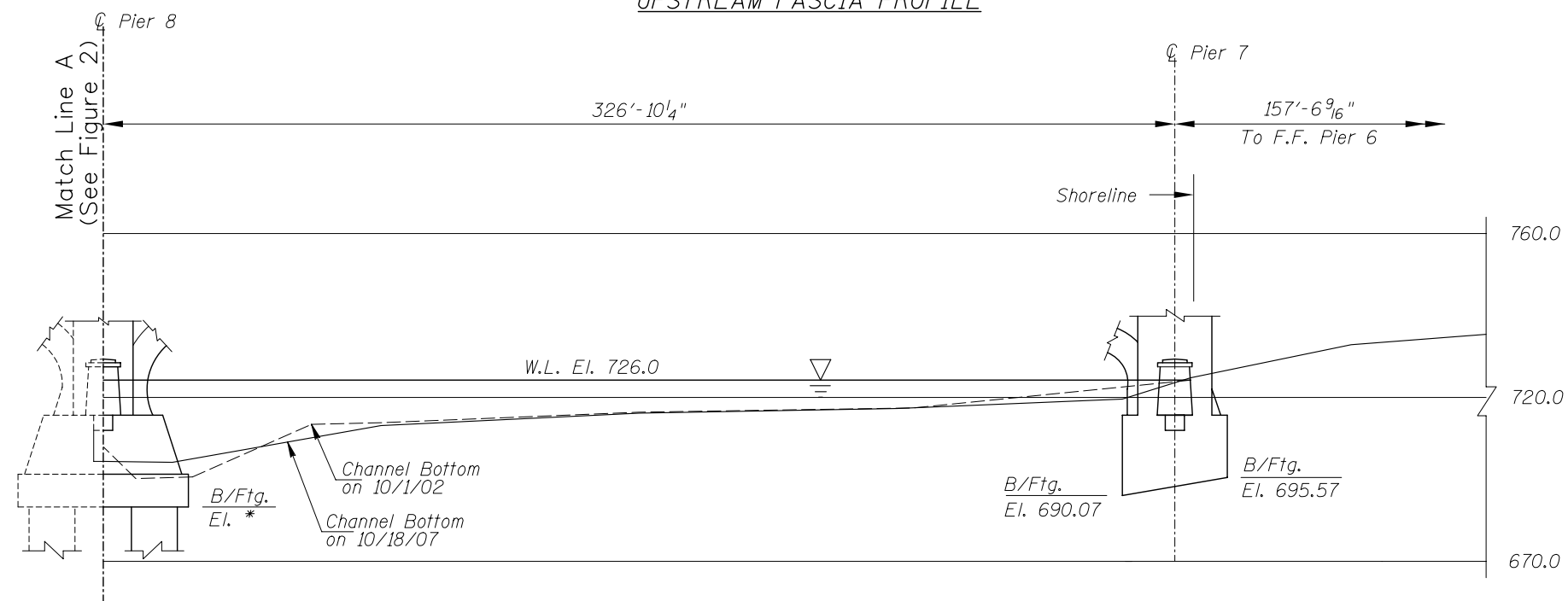
**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 3575  
OVER THE MISSISSIPPI RIVER  
DISTRICT 9, RAMSEY COUNTY  
**UPSTREAM AND DOWNSTREAM  
FASCIA PROFILES**

Drawn By: PRH	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT, 2007
Checked By: MDK		Scale: 1"=50'
Code: 52210122		Figure No.: 2



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

\* The bottom of footing elevation noted on the Design Plans does not correspond to the soundings and/or undermining detected at the time of the underwater inspection.

Note:

Refer to Figure 1 for General Notes.

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 3575  
OVER THE MISSISSIPPI RIVER  
DISTRICT 9, RAMSEY COUNTY  
**UPSTREAM AND DOWNSTREAM  
FASCIA PROFILES**

Drawn By: PRH	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT. 2007
Checked By: MDK		Scale: 1"=50'
Code: 52210122		Figure No.: 3

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 18, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 3575 WEATHER: Partly Cloudy, 60°F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: ☒ SCUBA ☐ SURFACE SUPPLIED AIR  
☒ OTHER

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, Probe Rod, Lead Line, Sounding Pole, U/W Light, Scraper, 14' Boat,  
Camera

TIME IN WATER: 4:10 p.m.

TIME OUT OF WATER: 4:50 p.m.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 1.0 foot

DEPTH 30.7 feet maximum at Pier 9

ELEMENTS INSPECTED: Piers 7, 8, and 9

REMARKS: Overall, the substructure units were found to be in good to satisfactory condition with no defects of structural significance at this time. Scaling was found around the perimeters of all piers. The footing was exposed around the entire perimeter of Piers 8 and 9. The footing at the northeast corner of Pier 8 was undermined with a cavity measuring 3 feet long by 1 foot high with up to 1 foot of horizontal penetration. Besides localized areas of 5 to 10 foot deep scour observed around Piers 8 and 9, the channel bottom around the substructure units appeared stable. There has been some aggradation at the piers since last inspection mostly related to new concrete rubble from recent bridge rehab, which also appears to have addressed some of the previously note pier defects.

FURTHER ACTION NEEDED: ☒ YES ☐ NO

Monitor footing exposures at Piers 8 and 9 and undermining at Pier 8 during future underwater inspections for further vertical face exposure and/or undermining.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 3575  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.  
WATERWAY CROSSED Mississippi River

INSPECTION DATE October 18, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 7	6.4'	N	7	N	9	N	7	8	7	7	8	7	7	N	N	N	N	N
	Pier 8	29.1'	N	7	7	9	N	7	6	N	N	6	7	7	N	N	N	N	N
	Pier 9	30.7'	N	7	7	9	N	7	7	7	7	7	7	7	N	N	N	N	N

\*UNDERWATER PORTION ONLY

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NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.